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COMMITTEE ON THE PEACEFUL
USES OF OUTER SPACE

IMPLEMENTATION OF THE RECOMMENDATIONS OF THE SECOND UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE

International cooperation in the peaceful uses of outer space: activities of Member States

Note by the Secretariat

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* This document has not been formally edited.

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INTRODUCTION

1. In accordance with a recommendation of the Committee on the Peaceful Uses of Outer Space at its thirty-seventh session, Member States have submitted information on the following topics:[1]

(a) Those space activities that were or could be the subject of greater international cooperation, with particular emphasis on the needs of the developing countries;

(b) Spin-off benefits of space activities.

2. The information on those topics submitted by Member States as of 30 November 1994 is contained in document A/AC.105/592; the information submitted between 1 and 31 December 1994 is contained in document A/AC.105/592/Add.1; the information submitted between 1 and 27 January 1995 is contained in document A/AC.105/592/Add.2; the information submitted between 28 January and 6 February 1995 is contained in document A/AC.105/592/Add.3; and the information submitted between 10 February and 22 March 1995 is contained in document A/AC.105/592/Add.4.

3. The present document contains information submitted by Member States after 23 March 1995.

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[1] *Official Records of the General Assembly, Forty-ninth Session, Supplement No. 20* (A/49/20), para. 29.

REPLIES RECEIVED FROM MEMBER STATES

CHILE

[Original: Spanish]

I. AIM

To report on national space activities, in particular those that have been or may be the subject of international cooperation. Isolated academic activities and/or information dissemination activities are not included.

II. CHILEAN ORGANIZATIONS WORKING WITH SPACE TECHNOLOGY

A. University of Chile

B. Pontifical Catholic University of Chile

C. University of Concepción

D. University of Tarapacá

E. Chilean Meteorological Office

F. Aerial Mapping Service

G. COSPAS/SARSAT Search and Rescue System

H. Chilean Air Force

III. ACTIVITIES UNDERTAKEN IN 1994

A. University of Chile

Through its Space Study Centre, this University is carrying out numerous activities concerned with the use of space technology, the main ones being:

1. TTC (telemetry, tracking and command) assistance on foreign space projects;

2. Provision of satellite information to various users in our country;

3. Satellite data applications in Chile, through research in various disciplines relating to Earth sciences, Earth resources and the environment, in conjunction with research groups at the University as well as national and foreign organizations.

As part of the activities described above, the Space Study Centre is developing a number of national and international environment programmes which benefit our country through accessibility to new knowledge and technologies, assistance on environmentally sound production processes and community support.

Programmes with agencies abroad include TTC services for:

- The Goddard Space Flight Centre of NASA;
- The Japanese National Space Development Agency (NASDA);
- The European Space Agency (ESA);
- The Space Agency of China.

B. Pontifical Catholic University of Chile

This University is conducting activities concerned with the use of satellite technology, under the Geographical Information System (GIS) and Remote Sensing Programme, involving the remote sensing, GIS and NOAA imaging laboratories.

This advanced research institute uses its own facilities to study natural resources, environmental problems, geology, oceanography, fisheries, forestry resources and mining, for which it has to acquire satellite images (SPOT and LANDSAT), at an approximate annual cost of US$ 33,000.

Since May 1993, it has possessed the capacity to receive direct information through the weather facsimile (WEFAX) system and to obtain data from the GOES and NOAA satellites.

All these activities benefit various governmental and private organizations under cooperation and research agreements, primarily with CODELCO, CONAF, the Ministry of Agriculture, the Chilean Meteorological Office, the Military Geographical Institute (IGM), SAF and the Chilean Antarctic Institute (INACH).

C. University of Concepción

This University has for some time shown a particular interest in participating in the field of space technology.

It has accordingly been developing the Multidisciplinary Remote Sensing Programme (PMPR), for which purpose it has fitted out laboratories with modern instrumentation, thereby providing it with the capacity for interacting with a number of specialized fields, such as forestry and oceanography.

In addition, its computer network is connected to the Internet satellite communications network.

It is currently in the process of acquiring an antenna for receiving data from NOAA satellites, which would significantly increase its capacities.

The University has undertaken major training activities for scientists and academics, and today possesses specialists in various disciplines concerned with space technology.

D. University of Tarapacá

This University is working on remote sensing and GIS applications in urban studies and environmental problems. In the short term, it intends to initiate research on the basis of ozone layer measurements in the southern hemisphere.

It also plans to pursue its own programmes on space physics and continue implementing the GIS and Remote Sensing Programme, participating in projects relating to urban area research on the city of Arica and evaluation of the environmental impact from the effects of mining operations in the country's first region.

This University operates cooperation agreements with the Federico Santa María Technical University concerning ozone layer measurements, with the Autonomous University of Mexico concerning space plasma diagnosis, and with the State University of Campinas on space plasma theories.

E. Chilean Meteorological Office

This agency, which is attached to the Chilean Air Force, uses satellite information in preparing weather forecasts. This information supplements that obtained from ground stations that employ traditional methods for obtaining meteorological data, in particular on regions below the cloud stratum.

Chile cooperates with the international meteorological community through a station on Easter Island which, with the help of specialized equipment, provides information for research in atmosphere chemistry.

In addition, the Chilean Meteorological Office has installed a radiometer in the Antarctic and in the metropolitan region for measuring ultraviolet B radiation. This equipment can detect radiation of this type and, by means of computerized techniques, quantify its intensity and determine its fluctuations.

F. Aerial Mapping Service of the Chilean Air Force

Set up in October 1963 as an official organ of the Chilean Government to conduct geographical activities in conjunction with its defence counterparts, the Aerial Mapping Service (SAF) has operated using both its own aerial photographic survey facilities as well as satellite pictures (LANDSAT) for aeronautical mapping of Chile and also for supplying various specialized photographic products for private investment projects or public-sector studies. Many of these studies are directly related to environmental issues, such as contamination in Santiago and the Bío-Bío river basin, large-area pollution, disposal of gaseous and solid wastes from mining operations, reservoir planning, forestry planning, environmentally compatible construction (Nevado Valley), quantification of hydrological reserves, etc.

SAF currently operates solely using direct photogrammetry, since its equipment for conducting digital image analysis is now obsolete. This is an essential requirement for carrying out its tasks, and it is therefore being proposed that digital image processing at the national level should be centralized at a national digital analysis centre within SAF, with a view to establishing a national land survey, mapping and image data bank. This will make it possible to improve the current data position whereby the various users (ministries, regional governments, universities, major enterprises) separately acquire satellite pictures, in many instances with duplication, and then conduct their own digital analysis, again individually.

G. COSPAS/SARSAT Search and Rescue System

Our country is incorporated into this system, whose information is obtained by the Space Study Centre at the University of Chile and transferred to the Search and Rescue Service (SAR) with a view to carrying out search and rescue operations for aircraft in distress.

This system is also used by the Navy in the event of accidents at sea.

It should be pointed out that Chile and Brazil are the only countries with a local user terminal (LUT) of the SARSAT system in Latin America.

H. Chilean Air Force

The Chilean Air Force (FACH) is currently developing the first experimental micro-satellite, known as FASAT-ALFA, which marks the start of a more ambitious national space programme. Under this national programme, it is envisaged that in the first phase the FASAT-ALFA satellite will be placed in orbit within a period of three years, in the second phase a mini-satellite designed for natural resource surveying will be placed in orbit within a period of 10 years, and finally a geostationary satellite intended primarily for communication purposes will be placed in orbit within a period of 15 years.

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INTRODUCTION

1. In accordance with a recommendation of the Committee on the Peaceful Uses of Outer Space at its thirty-seventh session, Member States have submitted information on the following topics:[1]

(a) Those space activities that were or could be the subject of greater international cooperation, with particular emphasis on the needs of the developing countries;

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3. The present document contains information on those topics submitted by Member States between 24 March and 15 June 1995.

[1] Official Records of the General Assembly, Forty-ninth Session, Supplement No. 20 (A/49/20), para. 29.

REPLIES RECEIVED FROM MEMBER STATES

EGYPT

[Original: English]

In 1975, a cooperative programme was undertaken by the Helwan Institute of Astronomy and Geophysics (HIAG), the Technical University of Prague (Czech Republic), the former Soviet Academy of Sciences and the Smithsonian Astrophysical Observatory (SAO) (United States), to set up a satellite laser ranging station at the observatory in Helwan (Egypt). The laser, the mount, and much of the electronics were furnished by the Czech specialists and SAO provided the station clock and funds for equipment purchase and operations from the United States excess currency programme. The Egyptians provided the site, local manpower, local services and support, and local data analysis and data evaluation. The Czech Republic and the former Soviet Union provided technical expertise and on-site support.

The site was operated for several months per year in support of global tracking requirements. The data were provided to American computational centres at SAO, the National Aeronautical and Space Administration's (NASA) Goddard Space Flight Centre, and the University of Texas, where it was processed and made available to investigators in the NASA Crustal Dynamic Programme and its predecessors. The original laser system at Helwan was a first generation instrument that had an accuracy of 1-2 meters on lower orbiting satellites. Through the years, by the efforts of the Czech and Egyptian specialists, the system was provided with a new mount, laser transmitter, electronics and detector. With the evolution of capability, the instrument is now routinely ranging to satellites with laser reflectors with a single-shot precision of a few centimeters.

In 1987, the laser station supported the crustal dynamics and Wegener programmes on a reimbursable basis, providing data on approximately 75 satellite passes during the period of June-September. The data were furnished for evaluation to the University of Texas which determined the system performance. In addition, calibration and system performance verification tests indicate that the overall accuracy is in the range of 1-3 centimeters. From 1989 to 1993, the station was again operated on a reimbursable basis for several months providing full data sets on laser satellites. A large amount of data on lower orbiting satellites over the period were obtained. The quality and quantity has continually improved to the point where the Helwan facility is now one of the fundamental stations in the global network. In 1993, the station acquired a total of 69 passes on Lageos-1, 186 passes on Lageos-2, 103 passes on Topex, 82 passes on Starlette, 127 passes on Ajisai and 88 passes on Mir-1. The operations were extended over a period of six months with the European Space Agency (ESA) also providing partial support.

The HIAG operate the station for regular tracking of the required satellites on their night-time passes, performs all the necessary calibration and performance evaluation measurements of the laser ranging system and makes resulting data available to the international community. Both quick-look normal-point data and full-rate data are forwarded to the European Data Centre in Munich (Germany) in standard format on a weekly basis.

The technical activities at Helwan station is under the direction of Professor M. Y. Tawadrous, head of Space Science Researches Department, National Research Institute of Astronomy and Geophysics (NRIAG).

The laser tracking system of the Helwan Satellite Ranging Station consists of:

- A two-axial mount provided with a mechanical gearing system and control optical devices;
- A laser transmitter with the necessary power supply and cooling equipment;
- A photoelectric receiver;
- A ranging electronics system;
- A global positioning system (GPS) time base; and
- A computer with a highly advanced hardware and software package for carrying out blind ranging observations of the artificial satellites in Earth shadow or daylight.

The scientists in the Space Science Department use these observations for many researches in the field of space sciences, such as:

- Studying the effect of the Earth's magnetic field on the motion of the artificial Earth satellites;
- Studying the gravity field of the Earth from the motion of artificial Earth satellites;
- Use of artificial Earth satellites for studying the figure of the Earth and for other geodetic applications;
- Studying the tectonic motion using Lageos-1 and Lageos-2 data;
- Studying the forces acting on artificial Earth satellites; and
- Participation in many international programmes such as SPIN, ATMOSPHERE, MERIT, WEGENER/MEDLAS.